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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/004,980	12/07/2001	James H. Lee	H-204145	1793

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EXAMINER	
ALEJANDRO, RAYMOND	
ART UNIT	**PAPER NUMBER**
1745	

DATE MAILED: 07/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/004,980	LEE ET AL.	
	Examiner	Art Unit	
	Raymond Alejandro	1745	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 May 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *20-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *20-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 05/25/04 has been entered.

This action is submitted in reply to the foregoing RCE. The applicants have overcome the objection only. Refer to the foregoing amendment for further details on applicant's rebuttal arguments. Thus, the present claims (including newly added claims 21-22) are rejected again over art as seen below.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 20-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Bloomfield 3982962.

This application is drawn to a fuel cell system wherein the inventive concept comprises the specific components. Other limitations include the catalytic combustor and the organic fluid.

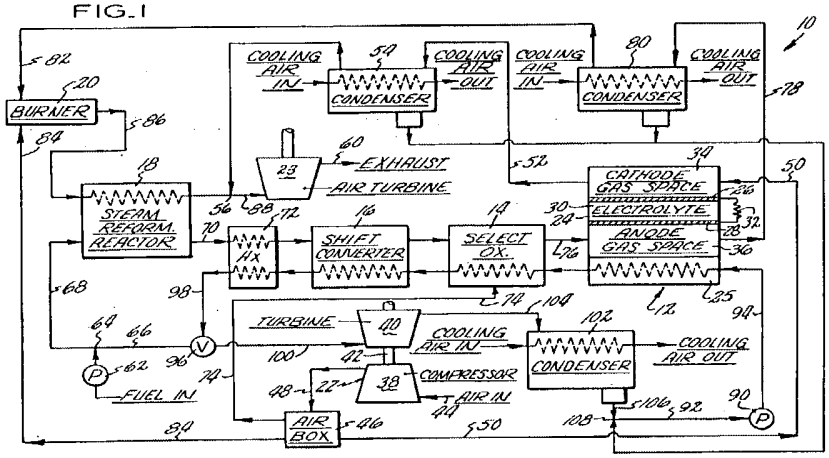
As for claim 20:

Bloomfield discloses a fuel cell power plant (TITLE) comprising as shown in **Figure 1** below a pump 90 delivering water via a conduit 92 into thermal exchange relationship with stack 12 via a conduit 94 by passing the water through the thermal exchange portion 25 of the stack (COL 5, lines 28-32). It is disclosed the fuel cells comprises a single cell 24 and a thermal management portion 25 (COL 3, lines 23-27). Bloomfield discloses that the liquid is increased in pressure by pumps (COL 4, lines 1-5). Bloomfield further discloses that part of the water is changed to steam as it passes through the stack 12. The water and steam is superheated by passing it into heat exchange relationship with the fuel conditioning apparatus. It is further heated in the selective oxidizer 14 and the shift converter 16 and in the heat exchanger 72 (COL 5, lines 32-40). The steam then leaves the heat exchanger 72 and is delivered to a valve 96. Then, the remainder of the superheated stream is delivered into turbine 40 (*the expander*) via a conduit 100. The turbine drives the compressor 38 for compressing the air for the stack. The turbine is a steam driven turbine, however, any steam driven engine operably connected to run a compressor may be used (COL 5, lines 40-50).

Bloomfield further teaches that the exhaust from the turbine 40 is delivered into a condenser 102 via a conduit 104. Heat is removed from the steam by passing air through the condenser as shown. Liquid water, or possibly a mixture of liquid water and steams, leaves the condenser 102 via a conduit 106 and is combined at 108 with water recovered from the anode and cathode effluent gas streams in the condensers 54, 80. The water is then delivered to the pump 90 via the conduit 92 and the process starts again (COL 5, lines 50-62). It is disclosed that the amount of water lost in the Rankine cycle loop is recovered in the condensers 54, 80 and

which is combined at 108 with the water which recirculates through the loop (COL 6, lines 1-6).

FIG. 1



Hence, Bloomfield teaches the specific pump, heat generating fuel cell system, expander, the compressor (the second fuel cell system component) and the condenser satisfying the specific spatial relationship and functional configuration as instantly claimed.

Bloomfield discloses alternate embodiments wherein the working fluid is not necessarily water (COL 6, lines 10-17). Bloomfield further discloses that the working fluid which is pumped around the system may be, for example, trichlorofluroethane, commonly known as Refrigerant 113, but any fluid having suitable vapor pressure and temperature characteristics may be employed (COL 6, lines 37-45). *It is noted that Refrigerant No. 113 is a chlorofluorocarbon.*

> **Referring now to the Rankine cycle portion of the power plant shown in FIG. 2, the working fluid is pumped around the system by a pump 216. The working fluid may be, for example, trichlorotrifluoroethane, commonly known as Refrigerant No. 113, but any fluid having suitable vapor pressure and temperature characteristics may be employed. The fluid passes into the**

In addition, the Examiner notes the following: with respect to the organic liquid, Bloomfield clearly specifies that water recovered from the anode effluent gas streams in the

condensers 54 or 80 is combined at mixing point 108 with the cooling fluid of the fuel cell power plant (COL 5, lines 50-62). Bloomfield also teaches that the anode gas stream effluent contains enough unburned gas (*emphasis added*) such that there is no need for the burner 20 to have a separated fuel supply (COL 4, lines 63-67). It is disclosed that on the anode side, a hydrogen containing liquid fluid such as naphtha is used as the reactant material. In addition, fuels such as methane may be used (COL 4, lines 1-15). *It is noted that naphtha and methane are organic fluids.* It is further disclosed that although the hydrogen containing liquid fuel such as naphtha is processed in the steam reforming reactor 18 (COL 4, lines 1-5), partial processed fuel leaves the reactor 18 (*emphasis added*), entering the shift converter 16 to only reduce the carbon monoxide of the gas stream (COL 4, lines 16-27), from the shift converter 16 the gases pass into the selective oxidizer 14 to even further reduce the carbon monoxide content of gases (COL 4, lines 28-36). Bloomfield also teaches that a shift converter or selective oxidizer is not required (*emphasis added*), wherein the requirement of the fuel conditioning apparatus are dependent in part upon the type of unprocessed fuel being used (*emphasis added*) and upon the particular design of the cells (COL 4, lines 40-50). *Having shown that: a) only partially processed fuel such as naphtha leaves the steam reforming reactor 18; b) no further fuel conditioning such as the shift converter and the selective oxidizer is required; c) unburned gas remains in the anode gas stream effluent, and d) the liquid water or a mixture of liquid water and steam leaving the condenser 102 via a conduit 106 is combined at 108* (*emphasis added*) *with stream recovered from the anode effluent gas streams, it is stated that some of the unprocessed and unburned naphtha reactant being fed into the reforming unit and the fuel cell will remain in the anode effluent gas stream and thus will be mixed at the mixing point 108 with the cooling water*

recirculating through the fuel cell cooling system. Accordingly, cooling fluid would includes both water and residual organic liquid naphtha as cooling liquid. That is to say, a mixture of cooling water and the unprocessed and unburned organic naphtha liquid will be circulating through the thermal exchange circuit of the fuel cell system. Therefore, Bloomfield's teachings envision that a mixture of liquid water and unprocessed-unburned organic liquid naphtha might be used as part of the organic cooling fluid of the fuel cell system.

Bloomfield discloses the fuel cell stack generally comprises a plurality of fuel cells 24 and a thermal management portion 25 (COL 3, lines 23-27/ COL 5, lines 27-31). *Thus, the heat generating component comprises the fuel cell stack itself.*

Bloomfield discloses other heat generating components such as the selective oxidizer 14 and the shift converter 16 as well as the heat exchanger 72 (COL 5, lines 28-40). The cooling fluid, for instance, picks up heat from the foregoing heat generating components (COL 5, lines 28-40). *In this case, the selective oxidizer and the shift converter represent catalytic combustors.*

It is disclosed that on the anode side, a hydrogen containing liquid fluid such as naphtha is used as the reactant material. In addition, fuels such as methane may be used (COL 4, lines 1-15). *It is noted that naphtha and methane are organic fluids.*

With respect to claim 21:

Bloomfield discloses the use of an organic Refrigerant No.113 trichlorotrifluoroethane (COL 6, lines 37-45). *It is noted that Refrigerant No. 113 is a chlorofluorocarbon.*

Thus, the claims are anticipated.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield 3982962 as applied to claim 20 above, and further in view of Keller 3968999.

Bloomfield is applied, argued and incorporated herein for the reasons above. However, Bloomfield does not expressly disclose the specific organic cooling fluid as recited in claim 22.

Keller discloses that a halo-substituted hydrocarbon like the Freons such as dichlorotetrafluoroethane is a suitable refrigerant for the standard heat exchange apparatus employed in refrigeration plants so as to cool methanol (COL 6, lines 52-68). Keller further discloses that methanol is a prime candidate for generating electricity in fuel cells, being one of the few known fuels suited to fuel cell power generation (COL 10, lines 8-20).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the specific organic cooling fluid of Keller in the fuel cell system of Bloomfield as Keller discloses that a halo-substituted hydrocarbon like the Freons such as dichlorotetrafluoroethane is a suitable refrigerant for the standard heat exchange apparatus because it has very little energy requirements as well as because this refrigerant is conventionally available and its selection and use in conventional refrigeration apparatus is tailored to the temperatures needed in the heat exchanger. In addition, since Keller discloses that dichlorotetrafluoroethane is a suitable refrigerant for the standard heat exchange apparatus employed in refrigeration plants so as to cool methanol, and given that Keller has also disclosed that methanol is a prime candidate for generating electricity in fuel cells, it is further contended that those of ordinary skill in the art would have sufficient motivation to use Keller's refrigerant in methanol fuel cells or fuel cells employing methanol. That is, in view of Keller's teaching, the technology for cooling methanol is applicable and employable in fuel cells operated by using methanol as fuels. *Moreover, this is also consistent with the fact that Bloomfield clearly discloses that the working fluid is not necessarily water and the working fluid may be any fluid having suitable vapor pressure and temperature characteristics. Thus, Keller and Bloomfield are pertinent to each other as they both address the same problem of providing suitable cooling fluids or refrigerant for fuel cells.*

Response to Arguments

Applicant's arguments filed 05/25/04 have been fully considered but they are not persuasive. The main contention of applicants' argument is grounded on the allegation that the

prior art of record fail to disclose using an organic cooling fluid. However, this assertion is respectfully disagreed with because as noted in the rejection above the prior art clearly discloses alternate embodiments wherein the working fluid is not necessarily water (Bloomfield, COL 6, lines 10-17). In addition, the prior art further discloses that the working fluid which is pumped around the system may be, for example, trichlorofluroethane, commonly known as Refrigerant 113, but any fluid having suitable vapor pressure and temperature characteristics may be employed (Bloomfield COL 6, lines 37-45). Thus, it is noted that the prior art has clearly envisioned and envisaged the use of an organic cooling medium in fuel cell applications regardless of whether or not the Rankine cycle loop does include the fuel cell. In that, it is further noted that a reference is good for what its teachings disclose or, at least, what the teachings, in general, of the reference would have suggested to those of ordinary skill in the art. The examiner does not understand applicants' position of *arbitrarily* arguing that because the Bloomfield reference teaches a separate Rankine loop, in fact, the reference is not teaching or suggesting using the chlorofluorocarbon organic cooling medium in fuel cell applications when it is remarkably outstanding that Bloomfield is addressing and solving the fuel cell heat exchanging mechanism, cycle or loop.

Furthermore, the examiner notes the following: with respect to the organic liquid, Bloomfield clearly specifies that water recovered from the anode effluent gas streams in the condensers 54 or 80 is combined at mixing point 108 with the cooling fluid of the fuel cell power plant (COL 5, lines 50-62). Bloomfield also teaches that the anode gas stream effluent contains enough unburned gas (emphasis added) such that there is no need for the burner 20 to have a separated fuel supply (COL 4, lines 63-67). It is disclosed that on the anode side, a hydrogen

containing liquid fluid such as naphtha is used as the reactant material. In addition, fuels such as methane may be used (COL 4, lines 1-15). It is noted that naphtha and methane are organic fluids. It is further disclosed that although the hydrogen containing liquid fuel such as naphtha is processed in the steam reforming reactor 18 (COL 4, lines 1-5), partial processed fuel leaves the reactor 18 (emphasis added), entering the shift converter 16 to only reduce the carbon monoxide of the gas stream (COL 4, lines 16-27), from the shift converter 16 the gases pass into the selective oxidizer 14 to even further reduce the carbon monoxide content of gases (COL 4, lines 28-36). Bloomfield also teaches that a shift converter or selective oxidizer is not required (emphasis added), wherein the requirement of the fuel conditioning apparatus are dependent in part upon the type of unprocessed fuel being used (emphasis added) and upon the particular design of the cells (COL 4, lines 40-50). *Having shown that: a) only partially processed fuel such as naphtha leaves the steam reforming reactor 18; b) no further fuel conditioning such as the shift converter and the selective oxidizer is required; c) unburned gas remains in the anode gas stream effluent, and d) the liquid water or a mixture of liquid water and steam leaving the condenser 102 via a conduit 106 is combined at 108 (emphasis added) with stream recovered from the anode effluent gas streams, it is stated that some of the unprocessed and unburned naphtha reactant being fed into the reforming unit and the fuel cell will remain in the anode effluent gas stream and thus will be mixed at the mixing point 108 with the cooling water recirculating through the fuel cell cooling system. Accordingly, cooling fluid would includes both water and residual organic liquid naphtha as cooling liquid. That is to say, a mixture of cooling water and the unprocessed and unburned organic naphtha liquid will be circulating through the thermal exchange circuit of the fuel cell system. Therefore, Bloomfield's teachings envision that*

a mixture of liquid water and unprocessed-unburned organic liquid naphtha might be used as part of the organic cooling fluid of the fuel cell system.

Therefore, one way or another and either directly or indirectly, the Bloomfield reference employs the organic cooling medium in the heat transfer cycle/loop of his fuel cell.

With respect to the teaching-away argument, it is pointed out that the question whether a reference "teaches away" from the invention is inapplicable to an anticipation analysis as a reference is no less anticipatory if, after disclosing the invention, the reference then disparages it. Arguments that the alleged anticipatory prior art teaches away from the invention' or is not recognized as solving the problem solved by the claimed invention, are not germane to a rejection under section 102. *Twin Disc, Inc. v. United States, 231 USPQ 417, 424 (Cl. Ct. 1986) (quoting In re Self, 671 F.2d 1344, 213 USPQ 1, 7 (CCPA 1982)). Refer to MPEP 2131.05 Nonanalogous Art.*

Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections.

Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Raymond Alejandro
Examiner
Art Unit 1745